

Virginia Division of Consolidated Laboratory Services (DCLS) Environmental Laboratory Certification Program

Technical Assistance Document

2021 Clean Water Act Methods Update Rule (MUR)

9/12/2022

The document provides information for laboratories implementing method changes to comply with the 2021 Clean Water Act (CWA) Methods Update Rule (MUR) and method changes to comply with similar updates impacting selected drinking water methods. This summary does not replace a laboratory's duty to fully review the published revision of all methods requiring update on a laboratory's scope and the duty to self-audit to ensure all aspects of the published method are addressed in laboratory procedures, practices, and recordkeeping.

This document is intended to highlight several key changes related to:

- *Updates to methods being made to the VELAP database, listed in Table 1 (below);*
- *Important information from footnotes within the method approval tables in 40 CFR 136.3; and*
- *Two frequently used methods (SM 2540 D-2015 and SM 5210 B-2016).*

The Virginia Environmental Laboratory Accreditation Program (VELAP) will require updates to method revisions in accordance with the MUR at a future date, referred to as the 2021 MUR Implementation Date. The MUR Implementation Date will be announced once it is established. These future updates are in accordance with:

- The [CWA 2021 MUR](#) and
- Recent Drinking Water Expedited Method Approvals located at [Appendix A to Subpart C of 40 CFR Part 141](#)

Virginia's Department of Environmental Quality (DEQ) will accept use of revised methods, as listed in Table 1, for Clean Water Act compliance in advance of the 2021 MUR Implementation Date. Drinking water methods approved at Appendix A to Subpart C of 40 CFR 141 are acceptable for Safe Drinking Water Act compliance.

To use the revised methods before the 2021 MUR Implementation Date, laboratories may request a change in scope by submitting a Request for Early MUR Transition, VELAP Form #46015, along with a Standard Operating Procedure demonstrating compliance with the latest approved revision. The form is available on [the VELAP webpage](#). This is an abbreviated change in scope procedure for the updates listed in Table 1 only. This abbreviated procedure omits requirements for proficiency testing and demonstration of capability based on the similarity of the method revision to the currently certified/accredited method. Fees for the change in scope processing will not

be required. A revised certificate will be issued by VELAP after review of the SOP and resolution of any concerns.

Laboratories with secondary accreditation under 1VAC30-46 need to only submit Form #46015 and the current primary certificate supporting the change in scope request.

When the 2021 MUR Implementation Date is established and announced, VELAP will provide revised instructions for this update process. Submission of the SOP and VELAP Form #46015 will not be required for updates made after the implementation date is established and announced.

Additional information on the VELAP implementation plan with tools to assist laboratories in this 2021 MUR process may be found on [the VELAP webpage](#) under the heading MUR – Method Update Rule – 2021.

Laboratories must determine the methods being updated by review of the laboratory's scope of certification or accreditation against the changes listed in Table 1 (see page 5). When updates are necessary, laboratories are expected to obtain the appropriate revision of the updated reference method, carefully review the method in full, and implement any required changes to ensure full compliance. Laboratories should direct any questions to the laboratory's lead assessor.

MUR 2021 HIGHLIGHTS:

Changes to Methods and New Methods Approved

Specific changes being made to the VELAP database are listed in Table 1, below. A list of newly approved methods and a list of all changes along with reasons for the changes can be found in the preamble of the [published MUR](#).

Updates to ASTM Methods

Forty-seven (47) ASTM methods were revised. Impacted laboratories should review revised methods carefully.

Updates to Standard Methods

Sixteen (16) Standard Methods (SM) were revised. Highlights of changes to two methods (SM 5210 B BOD/CBOD and SM 2540 D TSS) are provided below since these two methods are frequently used by VELAP laboratories. These highlights should help laboratories prepare to be compliant with these two revised methods and also demonstrate the importance of reviewing all details in any revised method to ensure compliance.

The SM updates were clustered in a few testing areas: solids, BOD/CBOD, cyanide, nitrate, TOC/DOC/DO, and selected microbiology methods.

[Important Footnote changes or additions: 40 CFR 136.3 Table 1B Footnote 84 re: Standard Methods QA/QC Chapters](#)

40CFR136.3 Table 1B Footnote 84 specifies the following QA/QC chapters apply to testing by Standard Methods: Section 2020-2017; Section 3020-2017; Section 4020-2014; Section 5020-2017.

- These sections may be downloaded at no cost from StandardMethods.org.
- Some of the QA/QC chapters were fully revised; all should be carefully reviewed to ensure full compliance for all applicable methods.
- IMPORTANT NOTE: Standard Methods published an [errata sheet](#) for SM 23rd Edition which included important corrections to Table 2020: II that make method blanks (MB) and laboratory fortified blanks (LFB) required for SM 2540B, 2540C, 2540D, and 2540E. These corrections are important because they are changes to the QA/QC requirements from previous editions. These QA/QC requirements are also described in Section A of SM 2540.

[Important Footnote changes or additions: 40 CFR 136.3 Table 1B Footnote 85 re: BOD/CBOD calculation of GGA acceptance limits](#)

This is a new footnote:

⁸⁵ Each laboratory may establish its own control limits by performing at least 25 glucose-glutamic acid (GGA) checks over several weeks or months and calculating the mean and standard deviation. The laboratory may then use the mean \pm 3 standard deviations as the control limit for future GGA checks.

However, GGA acceptance criteria can be no wider than 198 ± 30.5 mg/L for BOD₅. GGA acceptance criteria for CBOD must be either 198 ± 30.5 mg/L, or the lab may develop control charts under the following conditions:

- Dissolved oxygen uptake from the seed contribution is between 0.6–1.0 mg/L.
- Control charts are performed on at least 25 GGA checks with three standard deviations from the derived mean.
- The RSD must not exceed 7.5%.
- Any single GGA value cannot be less than 150 mg/L or higher than 250 mg/L.

[Important Footnote changes or additions: 40 CFR 136.3 Table 1A Footnote 16](#)

Footnote 16 applicable to *E. coli* MPN now specifies Quanti-Tray 2000 approval for enumeration of samples with high bacterial concentration tested with Colilert. (See also Footnote 18.)

[Important Footnote changes or additions: 40 CFR 136.3 Table 1A Footnotes 25 through 27](#)

Footnotes for aquatic toxicity method references now include an EPA document (EPA 821-R-02-012-ES) providing updates and corrections to the published methods.

[Important Footnote changes or additions: 40 CFR 136.3 Table 1A Footnotes 29 through 33](#)

Footnotes for bacterial method references for testing of Fecal Coliform, Total Coliform, E. coli, Fecal Streptococci, and Enterococci using Standard Methods are edited or new, providing requirements and clarifications which may be important to the users of these methods.

[Method Update: SM 5210 B 2016: Biochemical Oxygen Demand \(BOD\) and Carbonaceous Biochemical Oxygen Demand \(CBOD\)](#)

- Method 5210 was fully edited; many sections are clearer and contain more explanation. Laboratories are expected to carefully review all sections for changes as well as enhanced understanding of the procedure.
- Laboratories are reminded that BOD and CBOD are method-defined analytes; method modifications per 40 CFR 136.6 are not allowed.
- Section 4.b.1 allows samples with initial pH outside the range of 6.0 - 8.0 to be corrected to 6.5 - 7.5 (formerly 7.0 - 7.2).
- Section 4.c provides limits for copper and chlorine checks of source water and adds an exception / allowance for deionized water.
- Section 5.c includes an allowance for only preparing 2 dilutions of a sample based on experience with a specific sample matrix and a recommendation for considering more than 3 dilutions when historical sample knowledge is not available.
- Section 5.c.1 includes graduated cylinders for preparation of dilutions and changes the requirement for serial dilutions from “for dilutions greater than 1:100” to “for dilutions greater than 1:300”.
- Section 6.c requires “two or more” bottles of dilution water to be prepared as dilution water quality checks, with the resulting final DO’s to be averaged. The average DO uptake in 5 days is used to determine compliance with dilution water blank limits.

[Method Update: SM 2540 D 2015: Total Suspended Solids \(TSS\) or Residue, Nonfilterable](#)

- Method 2540 was fully edited; this summary is specific to 2540 D, TSS. Laboratories are expected to carefully review the method(s) in full for changes.

- Laboratories are reminded that tests such as TSS are method-defined analytes; method modifications per 40 CFR 136.6 are not allowed.
- A method blank (MB) and a laboratory fortified blank (LFB) (also called laboratory control sample (LCS)) are now required daily or per batch of 20 or fewer samples.
 - These additional Quality Control (QC) requirements are stated in sections 2020 2.d and e and 2540 A 5. These sections reference Table 2020:II.
 - Note that Standard Methods has published corrections to Table 2020:II.
 - These requirements for MB and LFB for the SM 2540 methods (2540 B, 2540 C, 2540 D, and 2540 E) are communicated in the [corrected Table 2020:II.](#)
- Sample duplicates are now required at a rate of 5% of samples (1 per 20) (reduced from 10% or 1 per 10).
- The revised method no longer requires repeating the cycle of drying, cooling, desiccating, and weighing for initial filter preparation, stating instead that adequate filter preparation is demonstrated by negligible weight loss or gain for method blanks.
- Section 3 c describes using suction “until all traces of water are removed” rather than for “about 3 min after filtration is complete”.
- Section 3.c provides only one criterion for weight stability for the sample: “Repeat the cycle (drying, cooling, desiccating, and weighing) until the weight change is <0.5 mg.”

[Method Updates: SM 9221-2014, SM 9222-2015, SM 9230-2013 for Total Coliforms, Fecal Coliform, Escherichia coli, and Enterococci](#)

- Refer to the revised methods including associated QC sections (ex: 9020-2015, 9030-2015, 9040-2013, 9050-2015, and/or 9060-2013 to self-audit for changes.

TABLE 1

TABLE 1 IS A SUMMARY OF METHODS BEING UPDATED IN THE VELAP DATABASE UPON FULL IMPLEMENTATION OF THE 2021 CLEAN WATER ACT METHODS UPDATE RULE (MUR). ALL MATRICES IN THE VELAP DATABASE WILL BE UPDATED FOR THESE METHODS WHEN THE MUR IS FULLY IMPLEMENTED IN VIRGINIA. THE DATE FOR FULL IMPLMENTATION WILL BE ANNOUNCED.

METHOD (OLD)	METHOD (NEW)	ANALYTES
ASTM D1067-11 2011	ASTM D1067-16	Alkalinity as CaCO ₃
ASTM D1126-12	ASTM D1126-17	Total Hardness as CaCO ₃
ASTM D1426-08 (A) (AS HACH 8038)	ASTM D1426-15 (A) (AS HACH 8038)	Ammonia as N
ASTM D1687-12 (A)	ASTM D1687-17 (A)	Chromium VI
ASTM D3590-11 (A)	ASTM D3590-17 (A)	Kjeldahl Nitrogen, Total (TKN)

ASTM D3590-11 MINUS SM4500-NH3	ASTM D3590-17 MINUS SM4500-NH3	Organic Nitrogen
ASTM D4282-02	ASTM D4282-15	Cyanide, Free
ASTM D4327-03	ASTM D4327-17	Bromide; Chloride; Fluoride; Nitrate as N; Sulfate
ASTM D516-11	ASTM D516-16	Sulfate
ASTM D516-11 (AS HACH 8051)	ASTM D516-16 (AS HACH 8051)	Sulfate
ASTM D516-11 (AS SEAL EPA- 165-A)	ASTM D516-16 (AS SEAL EPA- 165-A)	Sulfate
ASTM D5174-97	ASTM D5174-07	Uranium
ASTM D6919-09	ASTM D6919-17	Ammonia as N
ASTM D6919-09	ASTM D6919-17	Calcium; Magnesium; Potassium; Sodium
ASTM D7065-11	ASTM D7065-17	Nonylphenol
ASTM D7237-10	ASTM D7237-15 (A)	Cyanide, Free
ASTM D7511-12	ASTM D7511-12(17)	Cyanide, Total
SM 2540 B 2011	SM 2540 B 2015	Residue, Total
SM 2540 C 2011	SM 2540 C 2015	Residue, Filterable (TDS)
SM 2540 D 2011	SM 2540 D 2015	Residue, Nonfilterable (TSS)
SM 2540 E 2011	SM 2540 E 2015	Residue, Volatile; Volatile Suspended Solids
SM 2540 F 2011	SM 2540 F 2015	Residue, Settleable
SM 4500 CN C 2011	SM 4500 CN C 2016	Cyanide, Total - prep
SM 4500 CN E 2011	SM 4500 CN E 2016	Cyanide, Total
SM 4500 CN F 2011	SM 4500 CN F 2016	Cyanide, Total
SM 4500 CN G 2011	SM 4500 CN G 2016	Cyanide, Available
SM 4500 NO3 D 2011	SM 4500 NO3 D 2016	Nitrate as N
SM 4500 NO3 E 2011	SM 4500 NO3 E 2016	Nitrate-Nitrite
SM 4500 NO3 F 2011	SM 4500 NO3 F 2016	Nitrate as N
SM 4500 NO3 F 2011	SM 4500 NO3 F 2016	Nitrate-Nitrite
SM 4500 NO3 F 2011	SM 4500 NO3 F 2016	Nitrite as N
SM 4500 NO3 F 2011 (AS ASTORIA A173)	SM 4500 NO3 F 2016 (AS ASTORIA A173)	Nitrate-Nitrite
SM 4500 NO3 F 2011 MINUS EPA 353.2	SM 4500 NO3 F 2016 MINUS EPA 353.2	Nitrate as N
SM 4500 NO3 F 2011 MINUS SM 4500-NO2 B 2011 (CALC)	SM 4500 NO3 F 2016 MINUS SM 4500-NO2 B-2011 CALC	Nitrate as N
SM 4500 NO3 H 2011	SM 4500 NO3 H 2016	Nitrate-Nitrite
SM 4500 O G 2011	SM 4500 O G 2016	Oxygen, Dissolved (DO)

SM 5210 B 2011	SM 5210 B 2016	Biochemical Oxygen Demand (BOD)
SM 5210 B 2011	SM 5210 B 2016	Carbonaceous Biochemical Oxygen Demand (CBOD)
SM 5310 B 2011	SM 5310 B 2014	Dissolved Organic Carbon (DOC) [DW only]
SM 5310 B 2011	SM 5310 B 2014	Organic Carbon, Total (TOC)
SM 5310 C 2011	SM 5310 C 2014	Dissolved Organic Carbon (DOC) [DW only]
SM 5310 C 2011	SM 5310 C 2014	Organic Carbon, Total (TOC)
SM 9221 B 2006	SM 9221 B 2014	Total Coliforms
SM 9221 D 1999 [DW only]	SM 9221 D 2014 [DW only]	Total Coliforms
SM 9221 E 2006 (E+C)	SM 9221 E 2014	Fecal Coliform
SM 9221 F 2006	SM 9221 F 2014	Escherichia coli
SM 9222 B 1997	SM 9222 B 2015	Total Coliforms [DW only]
SM 9222 D 2006	SM 9222 D 2015	Fecal Coliform
SM 9230 C 2007	SM 9230 C 2013	Enterococci